

## CLAIMS:

1. A sonar antenna comprising an axially symmetric acoustic surface having the cross-sectional form of a generally U-shaped curve of non constant curvature; wherein  
5 the curve is shaped to allow continuous coherent ensonification such that the power in the echo returned from a uniform flat sea floor is substantially constant.

2. A sonar antenna according to claim 1, wherein the curve is catenary, hyperbolic or parabolic.

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3. A sonar antenna according to claim 2, wherein the curve has the form:

$$y(x) = (\cosh(Ax) - 1) / A$$

15 where  $x$  is across,  $y$  is vertical and  $A$  is constant.

4. A sonar antenna according to any preceding claim, wherein the U-shape cross-section of the acoustic surface extends unchangingly in the axial direction.

20 5. A sonar antenna according to any preceding claim, wherein there is one acoustic surface for both transmitting and receiving.

25 6. A sonar antenna according to any one of claims 1 to 4, wherein there are separate acoustic surfaces for transmission and reception, and both have the same U-shaped cross-section.

7. A sonar antenna according to any preceding claim, wherein a transmitting transducer is arranged with a single transmitting aperture extending over the entire transmitting surface.

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8. A sonar antenna according to any one of claims 1 to 6, wherein, there are a plurality of transmitting transducers each having the same U-shaped cross-section and stacked together in the axial direction.

9. A sonar antenna according to any preceding claim, wherein a plurality of receiving transducers are strung together and arranged along the U-shaped receiving surface.

5 10. A sonar antenna according claim 9, where the transducers are arranged contiguously along the surface.

11. A sonar antenna according claim 9, where the transducers are arranged spaced apart along the surface.

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12. A sonar antenna according claim 9, wherein not all the transducers are employed.

13. A vessel equipped with a sonar antenna according to any preceding claim  
15 mounted coaxially along its undersurface.